Work Order ID 64973

Wednesday, January 19, 2011 8:50:34 PM

Item ID: D2432 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: 206 (24") Bearpaw

Start Date: 1/5/2011 **Start Qty:** 8.00 **Cust Item ID:**

Required Date: 1/14/2011 **Req'd Qty:** 8.00 **Customer:**

Reference: 11.01.20

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr / **Revision Nbr**									
D2432 / Rev F3									
120	FLOW WATER JET	0.00							
Waterjet	**Memo**	0.00				B11-1-12			
FLOW CNC Waterjet	Cut Blank as per D2432 File								
130	HAAS CNC VERTICAL MACHINING #1	0.00							
HAAS 1	**Memo**	0.00				B11-1-12			
HAAS CNC vertical machine #1	1-Inspect material for defects or damage prior to machining 2-Machine as per Folio and Dwg D2432 Identify as D2432F 3-Deburr								
140	QC2- Inspect parts off machine FAI/FAIB	0.00				8			
QC	**Memo**	0.00							
Quality Control									

Dart Aerospace Ltd

W/O: 64973

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D2432 PAR #: _____ Fault Category: Machining NCR: (Yes) No DQA: _____ Date: 11.02.01

Resolution: Accepted Disposition: use as is. QA: N/C Closed: _____ Date: 11/02/02

NCR: 64973

WORK ORDER NON-CONFORMANCE (NCR)

DATE	STEP	Description of NC Section A	Corrective Action Section B: Initial Chief Eng	Action Description Chief Eng	Sign & Date	Verification Section C	Approval Chief Eng	Approval QC Inspector
11.01.28	130	.950" dimension down to .916" in one corner had to bring dimension to minimum to correct batch #, but mat'l thinner	11.01.28	Acceptable. REF ATTACHED SR.		11/01/02.	11.01.29	11.02.01
11.01.28	130	in places. operator error. Counter bore, 0.610 MIN THICKNESS REMAINING	11.01.28			11/01/02	11.01.29	11.02.01

NOTE: Date & initial all entries

Excerpt from SR-D315-670 Rev A

6.4 Shear Failure of the Clamp

$ec := 0.272 \cdot in$		Clamp edge distance
$tc := 0.063 \cdot in$		Clamp thickness
$A := 2 \cdot ec \cdot tc$	$A = 0.03 \cdot in^2$	Shear Area
$fsy := \frac{Fg}{A}$	$fsy = 4194.94 \cdot psi$	Shear Stress
$MS6a := \frac{Fsy2}{fsy} - 1$	$MS6a = 3.29$	**Margin of Safety (Limit)**
$MS6b := \frac{Fsu2}{SF \cdot fsy} - 1$	$MS6b = 6.95$	**Margin of Safety (Ultimate)**

6.5 Pull-out Failure of the Bearpaw

$Db := 0.75 \cdot in$		Counterbore hole diameter
$tb := 0.610 \cdot in$ WAS 0.650		Bearpaw thickness
$A := \pi \cdot Db \cdot tb$	$A = 1.44 \cdot in^2$	Shear Area
$fsy := \frac{Ft}{A}$	$fsy = 226.71 \cdot psi$	Shear Stress
$MS7a := \frac{Fsy1}{fsy} - 1$	$MS7a = 8.73$	**Margin of Safety (Limit)**
$MS7b := \frac{Fsu1}{SF \cdot fsy} - 1$	$MS7b = 9.29$	**Margin of Safety (Ultimate)**

6.6 Bearing Failure of the Bearpaw

Note that the bearing properties of the material (Fbry1 and Fbru1) were determined from testing outlined in Dart Report DR-1041, in Appendix B.

$Dh := 0.257 \cdot in$		Bearpaw hole diameter
$tb := 0.610 \cdot in$		Bearpaw thickness
$A := Dh \cdot tb$	$A = 0.16 \cdot in^2$	Bearing Area
$fby := \frac{Fg}{A}$	$fby = 917.07 \cdot psi$	Bearing Stress
$MS8a := \frac{Fbry1}{fby} - 1$	$MS8a = 2.05$	**Margin of Safety (Limit)**
$MS8b := \frac{Fbru1}{SF \cdot fby} - 1$	$MS8b = 2.05$	**Margin of Safety (Ultimate)**

MARGIN of Safety still positive so OK CP 11.01.28

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Start Date: 1/5/2011 **Start Qty:** 8.00 **Cust Item ID:**

Required Date: 1/14/2011 **Req'd Qty:** 8.00 **Customer:**

Reference:

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	QC8- Inspect parts - second check	0.00							
QC	**Memo**	0.00	ok 11/02/01			8	Ø		
Quality Control									
151	Identify as per dwg & Stock Location:_____	0.00							
Packaging	**Memo** PM 65247	0.00				11/2/2			
Packaging									
190	QC21- Final Inspection - Work Order Release	0.00							
QC	**Memo**	0.00				11/02/02			
Quality Control									

MF 11-02-02

Picklist Print

January 20, 2011 7:47:55 AM

Work Order ID: 64973

Parent Item: D2432

Parent Item Name: 206 (24") Bearpaw

Start Date: 1/05/11 **Required Date:** 1/14/11

Start Qty: 8.00 **Required Qty:** 8.00

Comments:

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
MUHMWB10		Purchased	No			120	sf	204.8794	3.7	29.6			
UHMW 1" Black													

Location	Loc Qty	Loc Code
MAT	204.8794	
114624	5.2734	
115325	15.506	
115955	38.8	
116281	13	
116554	132.3	

HB10 1-19

(8)

116554

DART AEROSPACE LTD	Work Order:	64973
Description: Bearpaw	Part Number:	D2432
Inspection Dwg: D2432 **Rev:** F3		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

[X] First Article [ ] Prototype

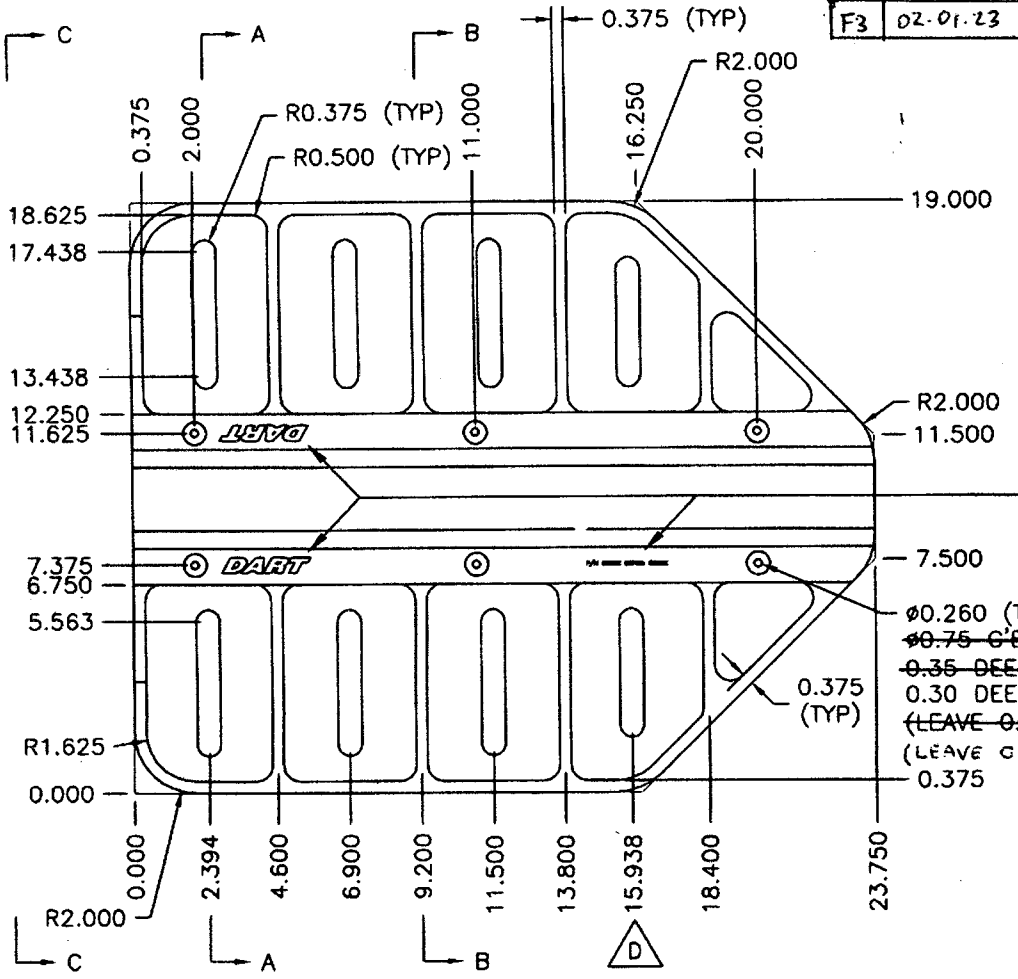
Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
A	0.063 x 45°	+0.030/-0.010	.063	✓		11-9-02	
B	5.500	+/-0.030	5.510	✓		all	
C	0.200	+/-0.030	.170	✓			
D	0.25 x 45°	+/-0.030	.25	✓			
E	R0.250	+/-0.030	.250	✓			
F	0.250	+/-0.010	.250	✓			
G	0.625	+/-0.030	.625	✓			
H	0.375	+/-0.010	.385	✓			
I	0.950	+0.030/0.010	.957	✓			
J	19.000	+/-0.030	19.000	✓			
K	3.14	+/-0.030	3.140	✓			
L	3.28	+/-0.030	3.250	✓			
M	Ø0.260	+0.005/-0.000	.260	✓			
N	Ø0.93	+/-0.030	.930	✓			
O	0.30	+0.030/-0.000	.305	✓			
P	23.750	+/-0.030	23.75	✓			
Q	7.375	+/-0.030	7.390	✓			
R	4.250	+/-0.010	4.250	✓			
S	2.000	+/-0.030	1.990	✓			
T	9.000	+/-0.010	8.995	✓			
U	9.000	+/-0.010	8.995	✓			
V	0.375	+/-0.010	.382	✓			

Measured by:		Audited by:		Prototype Approval:	N/A
Date:	11.1.27	Date:	11/02/01	Date:	

Rev	Date	Change		Revised by	Approved
A	04.01.09	New Issue	P/O K10008/D206-559-015	KJ/RF	RF

F1	99.03.03	ADD DEO 9143
F2	01.03.28	Ø0.93 WAS Ø0.75 RF
F3	02.01.23	CLARIFY BORE DIMS RF

RELEASED 98.06.17 KE

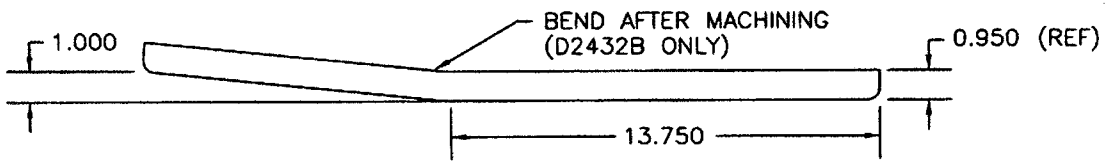


FLAT PATTERN

ENGRAVE LOGO TO MAX DEPTH OF 0.012. ENGRAVE PART AND BATCH NUMBERS TO MAX DEPTH OF 0.010. (TYPICAL LOCATION AS ILLUSTRATED)

w/o 6493

F2 F1 F



D2432F: FLAT BEARPAW
D2432B: BENT BEARPAW F

MATERIAL: UHMW BLACK PER SPEC CONTROL DRAWING D2689
1.00 THICK (MACHINE TO 0.950)

EFFECTIVE DEOs 9143

A	95.10.31	NEW ISSUE
B	96.01.24	RE-DESIGN
C	96.03.26	CHANGE BORE AND C'BORE DEPTH
D	96.06.04	MOVE SLOT
E	97.02.27	CHANGE C'BORE DEPTH, BORE RADIUS
F	98.05.12	CHANGE C'BORE, ADD B AND F P/N

DART

DESIGN KE | DRAWN BY KE | CHECKED | APPROVED | DATE 98.05.12

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. D2432 REV. F

TITLE BEARPAW SHEET 1 OF 2

SCALE 1:6

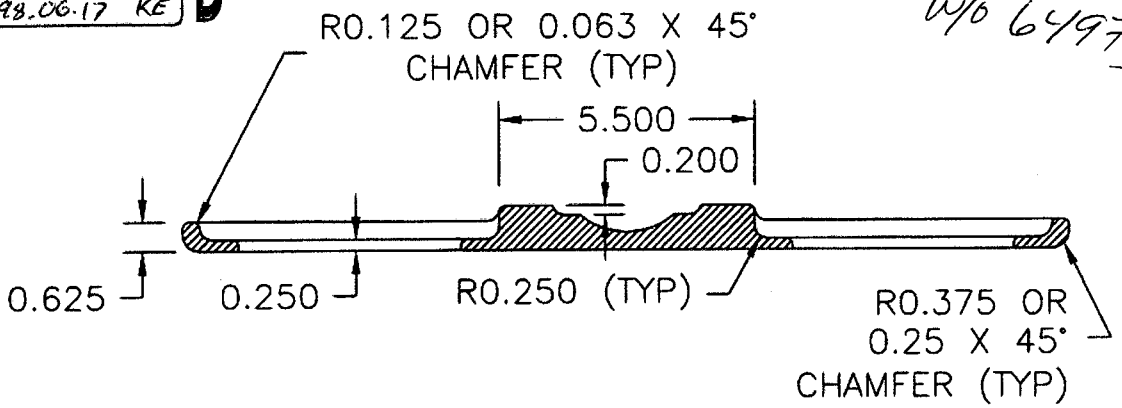
DART

COPY ISSUED

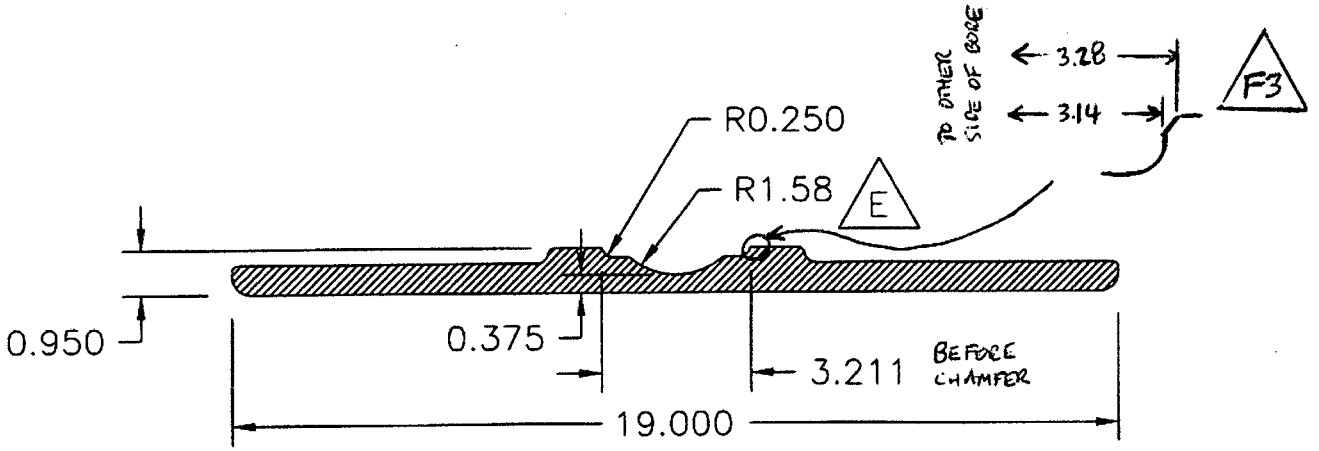
DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
KE	KE		
CHECKED	APPROVED	DRAWING NO.	REV. F
		D2432	SHEET 2 OF 2
DATE		TITLE	SCALE
98.05.12		BEARPAW	1:4

RELEASED
98.06.17 KE

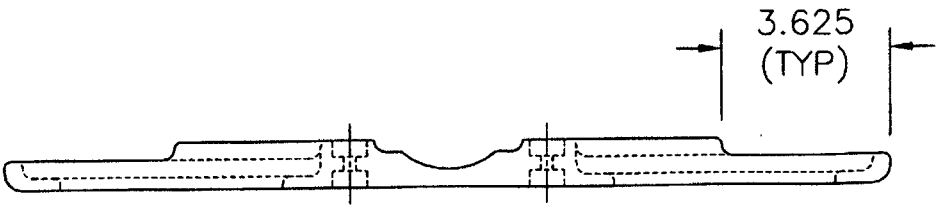
w/o 64973



SECTION A–A



SECTION B–B



SECTION C–C